FOREWORD

by Aileen Adams, Secretary, State and Consumer Services Agency

"When we build, let us think that we build forever." John Ruskin

This report, *Building Better Buildings: A Blueprint for Sustainable State Facilities,* provides common-sense recommendations that will save taxpayers money and preserve California's natural resources. It responds to Executive Order D-16-00, which Governor Gray Davis issued to ensure that state buildings are "sustainable" and cost-effective.

The *Blueprint* was prepared by the Sustainable Building Task Force, a unique partnership among more than 32 governmental agencies whose combined building, environmental, and fiscal expertise has produced outstanding proposals. Its recommendations should impact significantly how the state invests over $2.5 billion annually in construction funds, as well as an estimated $82 billion in needed infrastructure improvements over the next ten years.

Sustainable buildings use key resources like energy, water, and materials much more efficiently than buildings that are simply built to code. They create a healthier work environment, with more natural light and cleaner air, and contribute to employee productivity. Sustainable buildings are also cost-effective, saving taxpayer money — lots of it — not only by reducing operations and maintenance costs but also through lower utility bills. Quite simply, investing in appropriate sustainable features on the front end of construction pays off during the life of the building, often many times over.

Throughout the process of developing this report, the Task Force achieved many successes and dramatically improved the state's building process. Accomplishments include:

- ensuring significant energy and other resource savings in major state building projects which amount to over $1 billion;
- developing "leadership buildings" which can serve as prototypes for many state agencies;
- reforming state procurement practices by developing "sustainable" specifications;
- sponsoring the Greening of the Capitol Project; and
- proposing an environmental rating system for California buildings.

The Task Force proved the value of sustainable building during the development of the Capitol Area East End complex — the largest state building project in California history. As a result of its efforts, the project will save approximately $400,000 a year in energy costs alone and exceed the relevant building standards by more than 30 percent.

I would like to thank the members of the Sustainable Building Task Force for their invaluable contributions to the state's building process. Special recognition is due to State and Consumer Services Agency Deputy Secretary, Arnie Sowell, whose vision, leadership, and commitment to partnerships among diverse departments made this report possible. Above all, the Task Force has shown the importance of institutionalizing the inter-agency collaboration that led to the many accomplishments described in this report. This *Blueprint* is a powerful testament to the benefits of agency partnerships, which exemplify the "best" in government.

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Acknowledgments

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Executive Summary

Building Better Buildings: A Blueprint for Sustainable State Facilities

Implementing Executive Order D-16-00

BACKGROUND AND PURPOSE

Executive Order

On August 2, 2000, Executive Order D-16-00 established Governor Davis' sustainable building goals:

> ***...to site, design, deconstruct, renovate, operate, and maintain state buildings that are models of energy, water, and materials efficiency; while providing healthy, productive and comfortable indoor environments and long-term benefits to Californians. ****

The Executive Order directed the Secretary of the State and Consumer Services Agency (SCSA), Aileen Adams, to submit a report to the Governor, recommending strategies to incorporate cost-effective sustainable building practices into the development of state facilities, including leased property.

Sustainable Building Task Force

Secretary Adams convened an inter-agency Task Force to prepare this document, *Building Better Buildings: A Blueprint for Sustainable State Facilities (Blueprint)*. Members are listed in the Acknowledgements section of this report.

STATE BUILDING DESIGN, CONSTRUCTION, AND OPERATION

Cultural, Economic, and Environmental Significance

The State of California invests over $2.5 billion annually in the design, construction, and renovation of state facilities. State infrastructure needs, including new schools and office buildings, are estimated to exceed $82 billion over the next ten years.

Buildings reflect how we choose to live, learn, work, and play. They are concrete expressions of our values, embodying our aesthetic standards, historic considerations, and economic health. Buildings also affect the environment around them, the people who use them, and the resources dedicated to operate and maintain them. For example, buildings:

- Consume more than 30 percent of America's energy;
- Produce over 25 percent of our greenhouse gas emissions;
- Generate about 30 percent of the state's solid waste;
- Cost California state government over $600 million annually for energy, water, and waste disposal; and
- Affect the health, comfort, and productivity of building occupants, particularly when contaminants compromise indoor environmental quality.

*See Appendix 1 for full text of the Executive Order.

WHAT IS SUSTAINABLE BUILDING AND WHY IS IT BENEFICIAL?

Sustainable Buildings

Buildings can be designed, constructed, renovated, operated, and maintained in a cost-effective, resource efficient, and environmentally responsible manner. This is commonly known as "sustainable," "green," or "high performance" building. Sustainable buildings generally integrate technologies, practices, and systems that are:

- **Environmentally sound.** Sustainable buildings optimize energy, water, and materials efficiency; improve indoor environmental quality and comfort; use environmentally preferable products and processes; and are sited to ensure access to public transportation and affordable housing, take advantage of proper building orientation, and preserve community and historic integrity. Governor Davis recently issued Executive Order D-46-01 to provide guidance and establish priorities on how the Department of General Services will locate both leased and newly acquired state offices.

- **The result of superior design and construction methods.** Sustainable buildings apply life cycle costing to evaluate all relevant design and construction costs; use a whole building integrated design approach; and incorporate commissioning and post-occupancy evaluation programs to ensure proper building performance.

BREAKING GROUND FOR INTER-AGENCY COOPERATION

The Traditional Approach

Various state agencies conduct activities that affect the way we design and operate state buildings. These efforts, however, are limited to specific and separate topics under each agency's purview. Traditionally, state procedures perpetuate the treatment of a building as a collection of separate components, conceived and constructed by a collection of individuals performing discrete tasks with little interaction. The Task Force found that the state's current capital outlay process does not sufficiently integrate sustainable building practices and that tremendous opportunities exist to incorporate these practices into new construction, renovation, and leasing projects.

Teamwork: The New Approach

This report represents the latest phase in a steady trend to incorporate "sustainable building" into the state's building policies. Over the last eighteen months, the Task Force initiated a number of activities to integrate sustainable building practices into the state's capital outlay program. Many of these efforts involve new levels and modes of teamwork between disparate state programs and departments. A brief compilation of some of these activities follows:

Highlights of Sustainable Building Activities

- **Funding for Sustainable Building Design.** The Sustainable Building Technical Group worked with the Department of Finance to include additional funding for sustainable design analysis in capital outlay budget packages for specific new construction and renovation projects.

- **Sustainable Building Checklist.** Architectural and engineering firms under contract with the Department of General Services (DGS) to perform design and construction work now receive guidance in the form of two sustainable building checklists. Currently, 125 active capital outlay projects, totaling about $1 billion, have received the checklists.

- **Increased Energy Efficiency in the Capitol East End Project.** In early 1999, the Secretary of the State and Consumer Services Agency convened an inter-agency Task Force to incorporate sustainable building features into the bid documents for the Capitol East End Project — the largest state government office project in California's history. As a result, the East End Project's energy efficiency applications are anticipated to save taxpayers about $400,000 annually.

- **Leadership Buildings.** The Department of General Services contracted with HDR, a national architectural and engineering firm with sustainable building expertise, to conduct sustainable building reviews of several projects chosen for their prototypical value. These include forest fire stations for the Department of Forestry and Fire Protection.

- **Sustainable Building Website.** The sustainable building website **(www.ciwmb.ca.gov/GreenBuilding/TaskForce)** contains technical information on sustainable building, case studies, model design guidelines, project specifications, and links to other websites.

- **Inter-agency Training on Sustainability.** The California Integrated Waste Management Board (CIWMB) supported the Sustainable Building Task Force's activities by funding comprehensive sustainable building training for various state agencies.

- **Excellence in Public Building Initiative.** This program, launched by the Department of General Services, ensures excellence in architecture and art, as well as sustainability and community interaction

as part of all state building projects. A complementary program called "Golden Seal" focuses on developing an environmentally preferable cleaning product list.

- **California Specifications for National Rating System.** The Leadership in Energy and Environmental Design (LEED™) program is a building rating system developed by the United States Green Building Council (USGBC), a national organization specializing in sustainable building. The Sustainable Building Technical Group worked with the USGBC to draft a California supplement to LEED™. This draft document supplements the national LEED™ rating system with the appropriate state laws and regulations.

- **Links with Private Sector Building Owners.** A formal collaboration with the Building Owners and Managers Association (BOMA) has led to specific opportunities to cooperate on energy efficiency, sustainable building, and leasing projects throughout the commercial building sector.

- **Collaborative for High Performance Schools (CHPS).** CHPS is a partnership between the state's utilities, local government, the private sector, state agencies, and non-profit groups to develop high performance K-12 schools. Several Task Force members are contributing expertise to help make this a comprehensive effort covering the full range of sustainable building topics. To date, the Collaborative has developed the *High Performance Schools: Best Practices Manual*, conducted a series of school design workshops, and been awarded a federal grant to construct several model sustainable schools.

- **California Leadership Institute (CLI) Outreach Program.** A CLI working group prepared the first in a series of outreach tools — an electronic presentation — that the Task Force will use to educate state agencies and departments about sustainable building.

- **Modular Furniture Specifications.** Task Force members worked with the furniture industry and private consultants to establish environmental specifications for the state's $60 million modular furniture contract. Currently, the Prison Industry Authority (PIA), the state's primary supplier of office furniture, is in the process of certifying its compliance with the new environmental specifications.

- **Sustainable Procurement Task Force.** This inter-agency task force is collaborating closely with the Department of General Services Procurement Division to review purchasing practices and develop sustainable specifications for building materials, systems, services, and products.

- **California Commissioning Collaborative.** This ad hoc group of government, utility, and building services professionals is commit-

ted to developing and promoting viable building commissioning practices in California. The California Commissioning Collaborative aims to facilitate the development of cost-effective programs, tools, and techniques to encourage building commissioning in new and existing buildings.

- **Fuel Cell Collaborative.** The Air Resources Board (ARB) initiated a collaborative, comprising many of the Sustainable Building Task Force members, to advance the use of fuel cells for power generation in buildings and other stationary applications throughout California. The mission of the collaborative is to promote fuel cell commercialization as a means toward reducing or eliminating air pollutants and greenhouse gas emissions, increasing energy efficiency, and promoting energy diversity and independence.

- **Greening of the Capitol Project.** Task Force members, in conjunction with legislative staff, the Sacramento Municipal Utility District (SMUD), various sustainable building experts, and the Rocky Mountain Institute participated in a Greening of the Capitol workshop. The final Greening of the Capitol report will compile, for legislative review, a list of energy, water, and resource efficient design, maintenance, and operating strategies for the state's most prestigious building.

- **Smart Growth Activities.** The Governor's Office of Planning and Research (OPR) has initiated a series of "Smart Growth Roundtables" up and down the state. These Roundtables have involved 18 different communities — urban and rural — and have engaged over 400 stakeholders. The sessions have produced a wealth of ideas for smart growth that OPR is synthesizing into a "Smart Growth Playbook". The Playbook will constitute a comprehensive set of statewide policies that have been embraced by a broad cross-section of interested participants in the smart growth debate.

TRENDS AND BARRIERS

Complementary Trends for Sustainable Building

The Task Force examined and analyzed a series of trends that complement the Governor's sustainable building goals. These trends include:

- The growing public awareness of environmental issues and health concerns associated with buildings;
- New technological advances that make sustainable building practices more economically feasible;
- The availability and cost of energy; and
- Federal, state, and local government initiatives that promote and/or mandate urban renewal, waste diversion, smart growth, improved indoor environmental quality, and resource efficiency.

Barriers to Sustainable Building

The Task Force also identified a number of administrative, organizational, and fiscal barriers that impede the full-scale incorporation of sustainable building practices into the state's capital outlay program:

Incomplete Integration — Currently, each capital outlay project phase works largely in isolation from other phases, often with different goals and separate budgets. Therefore, the existing capital outlay process is not set up to incorporate specific sustainable building activities, such as an integrated design approach, commissioning, or post-occupancy evaluation. The process also lacks adequate project tracking and feedback mechanisms.

Lack of Life Cycle Costing — The state's capital outlay budget process generally focuses on a project's first cost without incorporating longer-term life cycle operational and maintenance factors. Recent Department of Finance funding changes will help to alleviate this difficulty.*

Insufficient Performance and Operating Standards — There are no uniform building performance, operating, and maintenance standards for state facilities (e.g., LEED™-based performance measures). Properly drafted, these standards should not be used as prescriptive guidelines, but as result-oriented performance measures.

Lack of Incentives — Because builders and designers do not profit directly from a building's operational savings, environmental performance, or worker productivity, they tend to have no real incentive to try new techniques or products.

Insufficient Technical Information — Because capital outlay decision-makers often lack technical data, many sustainable building applications are prematurely labeled as "unproven" or "too costly."

*The Department of Finance approved an additional funding increment for design analysis on a project-by-project basis for various capital outlay budget packages.

RECOMMENDATIONS

The recommendations set forth in this *Blueprint* seek to institute the Governor's sustainable building goals by maximizing the opportunities presented by current trends and resolving the issues presented by the barriers identified in the preceding section. The *Blueprint* recommends a ten-point plan.

1. **Modify the state's capital outlay process to ensure that the Governor's sustainable building goals are met and that appropriate projects are reviewed by the Sustainable Building Task Force.**

2. **Incorporate life cycle costing, integrated design, commissioning, and post-occupancy evaluation into the state's capital outlay program.**

3. **Develop cost-effective building performance, operation, and maintenance standards.**

4. **Invest additional resources for full-scale implementation of sustainable building practices.**

5. **Develop comprehensive annual reporting requirements to measure progress in implementing the state's sustainable building goals.**

6. **Develop "leadership buildings" to showcase sustainable building practices.**

7. **Develop sustainable building technical assistance and outreach tools, including a training program for state departments, as well as local government and private sector partners.**

8. **Create programmatic, fiscal, and administrative incentives to facilitate the implementation of successful sustainable building approaches, including a Governor's Sustainable Building Award.**

9. **Implement guidelines to acquire leased space with cost-effective sustainable building features.**

10. **Provide Task Force assistance to federal, state, and local agencies in key infrastructure areas.**

Building Better Buildings: A Blueprint for Sustainable State Facilities

Implementing Executive Order D-16-00

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"WE SHAPE OUR BUILDINGS, AND AFTERWARDS OUR BUILDINGS SHAPE US."

Winston Churchill

INTRODUCTION

The British statesman's observation resonates today. California, like the rest of the nation, must address various environmental issues: energy shortages, dwindling natural resources, and concerns about air quality and water supplies. How the state designs and manages its buildings will have far-reaching consequences on the work that is done within them, the taxpayers that ultimately pay for them, and our environment. This report, *Building Better Buildings: A Blueprint for Sustainable State Facilities (Blueprint),* responds to the Governor's Executive Order D-16-00 (see page 7). It describes "sustainable building" principles and lays the foundation for a continuing state commitment to sustainability.

IT'S JUST A BUILDING!

Because buildings are so much a part of our lives, we often overlook their importance. Buildings are products of our culture, but they also help to shape our aesthetics, work habits, leisure activities, and economy.

REFLECT OUR VALUES

Buildings and the infrastructure that supports them reflect how we choose to live, learn, work, and play. They are, literally, concrete expressions of our values, embodying our aesthetic standards and economic health.

AFFECT OUR ENVIRONMENT

Buildings also affect the environment around them, the people who use them, and the resources dedicated to operate and maintain them. Buildings and the infrastructure that supports them:

- Consume more than 30 percent of America's energy;[1]
- Produce over 25 percent of our greenhouse gas emissions;[2]
- Generate about 30 percent of the state's solid waste materials;[3]
- Cost California state government over $600 million annually for energy, water, and waste disposal;[4] and
- Affect the health, comfort, and productivity of building occupants, particularly when contaminants compromise indoor environmental quality. The U.S. Environmental Protection Agency ranks indoor air quality among the top five environmental risks to public health.[5]

WHAT IS "SUSTAINABLE" BUILDING AND WHY IS IT BENEFICIAL?

Over the last decade, the concept of "sustainability" has gained nationwide attention. Although sustainability may mean slightly different things to different people, in general, it embodies the notion of balancing long-term human needs with environmental considerations. The definition of "sustainable building" (often called "green" or "high performance" building) is also still evolving. Nonetheless, nearly everyone agrees that buildings containing at least the following key attributes are considered "sustainable":

- Siting considerations that encourage proximity to public transportation and affordable housing; promote economic renewal; review design options; and integrate historic and cultural values;
- Energy, water, and materials efficiency;
- Improved indoor environmental quality and comfort; and
- The use of environmentally preferable products and processes, such as waste diversion techniques and recycled-content materials.

Benefits

Sustainable buildings provide a variety of economic, environmental, human resource, and design and construction benefits.

Economic Benefits: Energy, Water, and Materials Efficiency

Sustainable buildings consume less energy and require fewer resources to operate.

Energy: Sustainable buildings are more energy efficient than conventional structures of comparable size and function. With rising energy costs, buildings designed to exceed Part 6 of Title 24 of the California Code of Regulations' energy efficiency standards (Title 24) or that generate energy on-site could have a tremendous economic impact on the state's energy needs and utility bills.

Water: Sustainable buildings integrate plumbing and landscaping techniques that increase water efficiency (e.g., waterless urinals, low flow fixtures, and drought tolerant plants). Water efficiency affects energy usage because it reduces the need to pump as much water.

Materials Efficiency: Sustainable buildings incorporate the use of dimensional planning, so less construction waste is generated; include space for recycling in their design; and use other waste diversion techniques as part of construction site management and normal building operations. This saves money by relieving the project from having to pay waste disposal fees, which can range as high as $85 per ton in certain regions of the state.[6]

Environmental Benefits Through Purchasing Decisions

For nearly every conventional building product made from virgin raw materials, there are recycled-content and zero- or low-emission alternatives (e.g., carpet, flooring, and ceiling tiles). In most cases, these recycled-content products have performance and durability characteristics similar to their virgin counterparts, and compare favorably in terms of price. In addition, manufacturing recycled-content products is generally more resource efficient and environmentally benign than the processes used to produce virgin materials.[7] Usually, these products are also made from less toxic substances, which means healthier indoor environments. Unfortunately, evaluating the long-term environmental and societal benefits of using these products is very difficult to quantify and, as a result, these benefits are not easily included in project cost equations.

In-depth look

The Energy Dimension

Energy efficiency reduces the demand for energy, the need for new power plants, greenhouse gas emissions, and saves money. It's an essential element of the sustainable building process. In California, at peak, the operation of commercial buildings consumes an estimated 35 percent of the state's electricity. If the industrial and government sectors are included, the consumption figure increases to about 60 percent.[1] In the last 20 years, electricity consumption in the commercial sector has doubled and can be expected to increase by another 20 percent over the next 10 years, based on current growth rates.[2] To encourage energy reliability, the California Public Utilities Commission (CPUC) authorized financial incentives for customers who produce their own energy through photovoltaics, wind turbines, and fuel cells using renewable fuel.[3] To increase energy conservation and curb demand, the State of California adopted the most energy efficient building standards in the world — the 2001 Title 24 standards. These standards are anticipated to save 200 MW annually over the next several years and 1,000 MW annually in five years.[4] Buildings can be designed and constructed to exceed the Title 24 standards cost effectively. Recently, the California Energy Commission analyzed the cost effectiveness of exceeding the 2001 Title 24 version for certain commercial building types. Its study concluded that, on average, it is cost-effective to exceed 2001 Title 24 by 13 percent, using existing technologies.[5]

Human Resource Benefits

Indoor contaminant levels can be 25 times as high as those outdoors,[8] and it is estimated that Californians spend 87 percent of their time indoors.[9] Consequently, enhancing the quality and comfort of the indoor environment cannot be underestimated, especially for children who constitute the largest group sensitive to the toxic effects of air pollution.[10] Improper ventilation or poor moisture control, compounded by the use of certain building materials or cleaning products that expose building occupants to volatile organic compounds (VOCs) and other pollutants, can quickly lead to indoor environmental quality problems. Symptoms can range from headaches, fatigue, and eye and respiratory irritation, to severe illness and permanent injury.

Documented health effects of indoor air pollutants include increased rates of respiratory infections, allergies, asthma, and risk of cancer. Research studies, including a recent report published by the Lawrence Berkeley National Laboratory, indicate that improvements in the indoor environment reduce these symptoms and increase worker productivity.[11]

Sustainable building techniques such as analyzing building material content help to promote healthier and more comfortable indoor environments.

In-depth look

The Human Dimension

Americans spend about 90 percent of their time indoors.[1] Given the choice, nearly everyone would elect to work or attend school in a room with a window rather than an enclosed interior space. But what is that window worth? Does it translate into a more productive worker in the form of reduced absenteeism or greater output? Many studies suggest that satisfaction with the physical environment is key to worker productivity. For example, one recent Pacific Gas and Electric-funded study examined the correlation between occupant productivity and exposure to daylight within retail[2] and school buildings.[3] The study demonstrated that sales increased by an average of 40 percent and school test performance improved typically 10 to 20 percent when occupants were exposed to daylight from non-glaring windows or skylights. In California, the estimated cost of decreased worker productivity due to workplace symptoms and health effects caused by indoor air pollutants is approximately $6 billion.[4] Thus, buildings that have improved indoor air quality, the presence of natural light, reduced exposure to toxins, and individual control of thermal comfort are likely to be healthier, more comfortable, and more productive places to work. Most building researchers agree that this is true, but have been unable to establish widely acceptable methods and techniques to measure and quantify the effects of the indoor environment on worker productivity.

System Efficiency Benefits

Sustainable buildings employ superior design and construction methods, including:

- **Life cycle costing:**
  Life cycle costing allows a project team to evaluate the costs of specific building features or systems over a longer time frame. When first costs are considered together with operating and maintenance costs, decision-makers are given a more realistic cost comparison over the long-term.

- **An integrated design approach:**
  Buildings should be designed as a whole system, rather than a collection of stand-alone components. In the integrated design approach, the architects, mechanical and electrical engineers, and interior designers become a project team, rather than a collection of individuals performing discrete tasks with very little interaction. This encourages decisions that emphasize integration, efficiency, and performance.

- **Commissioning and post-occupancy evaluation:**
  Commissioning is a systematic process of inspection, testing, and training. It confirms that a building and its component systems meet the requirements of the occupants and conform to the design intent. This quality assurance procedure begins during the building design phase and can extend many years. Post-occupancy evaluations use occupant feedback to identify problems and find solutions. It identifies design features that are performing well and those that need to be improved.

  Together, commissioning and post-occupancy evaluations enhance building performance, reduce initial and ongoing operating costs, and provide data for improving future building designs.

Benefits: Proper Siting Decisions

Buildings and the infrastructure that support them can affect land use patterns, traffic congestion, local economies, historic preservation considerations, watershed and wildlife habitats, and community livability. Proper siting decisions are one of the most critical elements in the sustainable building equation. Sustainable building attempts to give high priority to siting decisions that have the least environmental impact, encourage economic revitalization, take advantage of public transportation and affordable housing, preserve cultural and historic considerations, and promote strategies that encourage livable communities. Siting decisions also involve orienting buildings to take advantage of natural light and ventilation, as well as other resource efficient design attributes.

Governor Davis recently issued Executive Order D-46-01 to establish priorities and provide guidance on the process the Department of General Services will use to locate both leased and newly acquired state offices. The policy is designed to support smart growth patterns and includes such considerations as: using existing state-owned assets; proximity to public transit and affordable housing; locations that utilize structures of historic, cultural or architectural significance; and sensitivity to neighborhood economic revitalization. (See Appendix 2 for the text of Executive Order D-46-01.)

Benefits: Long-Term Considerations

Total building costs viewed over a thirty year period provide some perspective on the benefits of sustainable building. Within that framework, initial building costs account for only 2 percent of the total, while operation and maintenance costs equal roughly 6 percent, and personnel costs are 92 percent.[12]

These figures illustrate that the operational and maintenance costs of a building are three times that of initial building costs. Moreover, these figures also show that first costs combined with operation and maintenance costs are dwarfed when compared to the salaries and wages of the workers that occupy buildings. Consequently, when we build, our objective should shift from one that solely focuses on first cost budgeting to one that more rigorously values maximizing long-term operational and maintenance cost savings and, more importantly, the health, comfort, and productivity of building occupants.

EXECUTIVE ORDER D-16-00

Recognizing the importance of the state's role as a major consumer of office space and its potential to showcase exemplary building methods, Governor Davis issued Executive Order D-16-00, on August 2, 2000, establishing the state's sustainable building goals:

> ***...to site, design, deconstruct, renovate, operate, and maintain state buildings that are models of energy, water, and materials efficiency; while providing healthy, productive and comfortable indoor environments and long-term benefits to Californians.***

Including sustainable building practices in the state's capital outlay program sets a powerful precedent for responsible energy consumption and environmental protection. To that end, the Executive Order also provides direction to:

> ***...implement the sustainable building goal in a cost-effective manner, while considering externalities; identify economic and environmental performance measures; determine cost savings; use extended life cycle costing; and adopt an integrated systems approach.****

EXECUTIVE ORDER REQUIREMENTS

The Executive Order directs the Secretary of the State and Consumer Services Agency (SCSA), Aileen Adams, to submit a report to the Governor, recommending cost-effective strategies to incorporate sustainable building practices into the development of state facilities, including leased property. This report, *Building Better Buildings: A Blueprint for Sustainable State Facilities,* is the first in a series of annual reports that will document state government's progress in implementing the Governor's sustainable building goals.

SUSTAINABLE BUILDING TASK FORCE AND TECHNICAL GROUP

To implement the Executive Order and develop this *Blueprint*, Secretary Adams formally convened an interagency Sustainable Building Task Force (Task Force) and Technical Group. These groups were comprised of representatives from various state agencies with fiscal, construction, energy, and environmental policy expertise. Secretary Adams also invited private and other public sector sustainable building experts to comment on this document. The Acknowledgments page provides a full listing of Task Force and Technical Group members, as well as invited reviewers.

*See the complete text of the Executive Order in Appendix 1.

STATE ACTIVITIES: INTER-AGENCY COOPERATION

Several state agencies conduct activities that affect the way we design and operate state buildings. These efforts, however, are limited to specific and separate duties under each agency's purview. Recently, numerous state agencies and local governments have adopted policies and implemented practices compatible with "sustainable building." Many of these developments resulted from participation on or interactions with the Sustainable Building Task Force and Technical Group. This section highlights public and private sector responsibilities and activities in the sustainable building arena. For more information about sustainable building resources and activities, visit www.ciwmb.ca.gov/GreenBuilding/TaskForce.

Department of General Services (DGS)

DGS provides comprehensive real estate, fleet management, procurement, and energy assessment services to state agencies. Activities include property sales, project construction and management, and building leasing and maintenance. Because of its wide-ranging real estate responsibilities, DGS is a key player in implementing the Governor's sustainable building goals.

Department of General Services: Real Estate Services Division (RESD)

The Real Estate Services Division has a full menu of sustainable building activities. These include:

- Incorporating a requirement in Requests For Proposal that design firms consider energy efficiency and sustainable building measures. More than 500 design firm RFP submittals include energy efficiency and sustainable building design expertise on their teams.
- Including a contractual requirement that all new projects consider and include energy efficiency and sustainable building measures.
- Retaining a consultant, HDR, to review and make sustainable building recommendations on five prototype projects.
- Working with its major customers, 41 in total, to incorporate energy efficiency and sustainable building measures into their planning processes including specific wording for capital outlay budget change proposals.
- Including contract requirements to recycle construction waste and report on the amount of recycled content building material in all construction contracts.

- Developing a benchmarking process that will review at least 7 state facilities in its first phase against the U.S. Environmental Protection Agency's ENERGY STAR® for Buildings Program.
- Updating the sustainable or "tier" checklists that accompany all design and construction contracts.

Leased properties

DGS oversees the state's 2,088 leases encompassing 21 million square feet, roughly 10 percent of the space used by state facilities. More than 50 percent of these leased properties are located in the Sacramento region. The Task Force worked with RESD's Leasing Branch to incorporate energy efficiency and sustainable building measures into the state's standard lease form. In the coming months, the Task Force will work with DGS to develop sustainable operating standards for leased properties.

Department of General Services: Energy Management Division (EMD)

The Energy Management Division's activities focus on energy generation, use, and conservation, all of which affect sustainable building design. The Division is currently conducting an inventory of state facilities to identify opportunities for distributed generation. Some of this distributed generation will include environmentally preferable technologies such as photovoltaic equipment, fuel cells, cogeneration, and wind-powered turbines. Support for this technology will strengthen these industries and make the technology more affordable for use in future capital outlay projects.

Department of General Services: Procurement Division (PD)

California purchases over $4 billion of goods and services annually. The Procurement Division, through its purchasing, contract management, and specification writing responsibilities, is involved either directly or indirectly in a majority of state government purchases. The Procurement Division, as part of the Sustainable Building Task Force, is reviewing procurement practices and developing sustainable specifications for building materials, systems, services, and products. Task Force efforts will help ensure that state procurement contracts contain products, systems, services, and technologies that are environmentally responsible.

The Division also investigates, evaluates, and promotes the use of energy efficient, recycled-content, and environmentally friendly products as part of the State Agency Buy Recycled Campaign requirements.

California Air Resources Board (ARB)

ARB's programs and regulations help reduce indoor and outdoor air pollution related to buildings. ARB regulations also affect the siting, permitting, construction, and demolition of facilities.

The Board provides technical input to the Department of Health Services (DHS) in developing guidance for reducing volatile organic compounds (VOCs) in office buildings, and preventing indoor pollution problems in relocatable and renovated classrooms.

The Board also initiated a Fuel Cell Collaborative in California. Several Task Force members participate in this effort to promote fuel cell commercialization and use in state facilities as a means to reduce air pollutants and greenhouse gas emissions, increase energy efficiency, and build energy independence.

California Community Colleges (CCC)

California's community colleges comprise the largest post-secondary educational system in the world, serving over 1.4 million students. The system includes 4,700 buildings and 53 million square feet of space. The CCC is likely to spend roughly $96 million on energy in 2000-2001. The CCC is preparing a statewide energy management plan that includes alternative technologies, renewable energy, and sustainable construction.

California Department of Health Services (DHS)

The DHS Indoor Air Quality Section has designed and implemented indoor air quality standards for various state capital outlay projects. DHS, in cooperation with other state agencies, coordinated the development of indoor air quality and other sustainable specifications for the Capitol Area East End Project.

DHS recently expanded its laboratory capabilities and is starting a program with the CIWMB to measure emissions from building materials. DHS, along with the ARB, is also conducting a statewide investigation of environmental conditions in portable classrooms.

California Department of Toxic Substance Control (DTSC)

Under DTSC's oversight, all proposed school sites receiving state funding for acquisition and/or construction are required to go through a rigorous environmental review and clean-up process. This ensures that selected school properties are free of contamination. DTSC also reviews products for compliance with their environmental claims and material content.

California Department of Water Resources (DWR)

DWR promotes water use efficiency in state buildings and on state grounds. Energy efficiency and water efficiency are linked because it takes energy to pump water. Therefore, activities that conserve water also result in energy efficiency. DWR guidelines for water efficiency and reclamation are key components of sustainable building. In the coming year, DWR plans to update its water efficiency guide, as well as expand its leak detection, water audit, and landscape management programs.

California Energy Commission (CEC)

The Commission administers a broad range of energy-related programs and funding, including peak load efficiency grants, the Public Interest Energy Research program, the Bright Schools program, and renewable energy activities. California's energy efficiency building and appliance standards (Title 24) set the mark for the rest of the country and have helped Californians save more than $15.8 billion in electricity and natural gas costs.[13]

The CEC recently adopted new Title 24 energy efficiency standards. These 2001 standards are considered the most energy efficient requirements for residential and non-residential construction in the world. They are expected to save 200 MW annually and, in five years, 1,000 MW annually.[14]

The CEC is currently administering a variety of energy efficiency programs and funding authorized by legislative measures to address the state's energy situation.

Department of Housing and Community Development (HCD)

The Department of Housing and Community Development administers housing and community and economic development programs. HCD can integrate sustainable building practices into its activities to reduce the cost of housing development and promote affordable homeownership. The Task Force is exploring ways to incorporate sustainable building into the HCD grant criteria for its urban renewal, farmworker, and affordable housing programs.

California Department of Transportation (Caltrans)

Caltrans designs, constructs, rehabilitates, and maintains thousands of miles of state and federal roadways. As a result, it is in a unique position to incorporate sustainable building practices into many of its projects. Caltrans' activities include:

- Retrofitting existing traffic signals with energy efficient light emitting diode (LED) technology;
- Crushing and reusing roadway materials in new and rehab construction projects;
- Using processed tires (i.e., tire shreds or rubberized asphalt concrete) in overlays and stabilization projects;
- Operating a statewide network of recycle yards to store post-construction recyclable material; and
- Collecting and composting roadway green waste for use in erosion control and to reduce irrigation requirements.

University Systems—University of California (UC) and California State University (CSU)

UC and CSU facilities comprise 47 percent of state-owned property. The CSU and UC systems initiate over $400 million annually in state funded construction and renovation projects. Jointly, CSU and UC are developing a comprehensive energy plan for all nine UC and twenty-two CSU campuses.

The CSU Chancellor's Office:

- Published the *CSU Architectural and Engineering Procedure Guide* to reduce long-term energy use and operational costs;
- Holds workshops for its facilities' professionals on sustainable building practices; and
- Is developing sustainable building design standards to address the operational costs, energy usage, and environmental impact of its facilities.

The UC Office of the President is currently reviewing its policies and procedures, particularly in the areas of design, construction, energy, water, and materials to develop sustainable building guidelines.

California Integrated Waste Management Board (CIWMB)

The CIWMB oversees the management of 52.5 million tons of solid waste generated in California each year. Because construction and demolition debris comprise about 28 percent of the state's solid waste stream[15] and about 12 percent of landfill waste, sustainable building is a significant focus of the CIWMB.

The CIWMB's Green Building Program commenced in 1996 with the approval of its Sustainable Building Plan. In 1999, the CIWMB launched an aggressive three-pronged sustainable building initiative focused on: executive level support, a public and private sector grant program, and training and outreach. The CIWMB has awarded over $1.7 million in funding related to these activities.

The CIWMB facilitates the Technical Group's activities, administers the sustainable building website, and serves as a clearinghouse for all types of sustainable building resources.

California Office of Environmental Health Hazard Assessment (OEHHA)

OEHHA conducts health risk assessments and develops protective standards and guidelines for contaminants. Products and data used for Sustainable Building design include:

- Indoor air quality materials to assess and maintain healthy indoor environments;
- Technical guidelines used by DHS to reduce VOC exposure in office buildings;
- Environmental specifications for office furniture; and
- Indoor environmental quality standards for schools.

K-12 Schools: Collaborative for High Performance Schools (CHPS)

With a shortfall of over 430 new schools to accommodate the state's rising K-12 student population, the CHPS, comprised of government, utility, and non-profit groups,[16] is the focal point of activities to build sustainable schools (see Educational Showcase on page 19).

General Infrastructure

Governor Davis' Executive Order D-4-99, created the Commission on Building for the 21st Century. The Commission is required to identify critical infrastructure needs and develop a long-term capital investment plan. The Commission's report will be released soon, and the Task Force provided significant input on sustainable building for the report.

Local Governments

Several local governments have joined together to form the California Green Building Collaborative. The Collaborative held a series of workshops and is considering establishing statewide green building guidelines. Many local governments throughout California are just getting started in the sustainable building arena. Others, many of which are involved in the Collaborative, already have green building programs and/or local ordinances. (See Appendix 3 for a listing of various local government and other sustainable building activities.)

Other State Agency Activities

The Task Force is working with many state agencies in a variety of infrastructure areas to integrate sustainable building principles into their facility design, construction, and grant programs (e.g., housing, libraries, museums, roadways, the financing policies of the Public Employees Retirement System, and utility energy programs). Two examples of how the Task Force interacted with specific state agencies are described below:

Department of Forestry and Fire Protection. CDF oversees 2,550 structures comprising 530 state facilities. Of these facilities, 71 percent were constructed prior to 1960, and their average age exceeds 44 years. CDF has a backlog of construction projects estimated to cost $1.1 billion, and its capital outlay plans are to replace about 25 facilities per year for the next 20 years. CDF is exploring the appropriate application of sustainable building practices, materials, and equipment for inclusion in the facilities it constructs. Under Task Force and DGS auspices, HDR reviewed the Campo Fire Station as a prototype sustainable building facility.

Department of Corrections. CDC operates 33 state prisons and 38 conservation camps. It also oversees a variety of community correctional facilities. Through CDC's construction program, guidelines were established that incorporate energy, resource, and water efficiency. HDR reviewed the CDC Correctional Training Center project, and, as a result, the Task Force will work with the CDC to incorporate additional sustainable building features into many of its upcoming projects.

FINDINGS AND ACCOMPLISHMENTS

Sustainable building principles are not integrated fully into the state's current capital outlay process. The lack of an accepted life cycle costing methodology, concerns about specific technologies, and the difficulties inherent in managing the integrated design approach continue to hamstring the complete integration of sustainable building into the state's capital outlay process. Nonetheless, significant opportunities exist to incorporate sustainable building practices into new construction, renovation, and leased facility projects. The Task Force and Technical Group have made considerable strides to take advantage of these opportunities.

Opportunities Abound

State government owns and operates an immense inventory of public infrastructure — 189 million square feet of building space, as well as an additional 21 million square feet of leased space. The State of California invests over $2.5 billion annually in the design, construction, and renovation of state facilities. According to the State of California's Five-Year Capital Outlay Plan, anticipated infrastructure needs over the next ten years exceed $82 billion, including new schools, office buildings, infrastructure projects, renovations, and other bond-funded construction.[17]

We Can Learn From Accomplishments

The Task Force and Technical Group took a number of steps to begin integrating sustainable building practices into the state's capital outlay program, as described briefly below.

Funding for Sustainable Building Design

The Sustainable Building Technical Group worked with the Department of Finance to include an additional funding allocation for sustainable design analysis in capital outlay budget packages. Additional funding will be included on a case-by-case basis to:

- Analyze various siting alternatives and design options;
- Conduct energy modeling and computer simulations for building performance and life cycle costing; and
- Develop product specifications.

Project teams, in conjunction with the Department of Finance, will evaluate the proposed design options to decide which sustainable technologies and systems to include in the project's construction budget.

Sustainable Building Checklist

The Department of General Services' Real Estate Services Division changed its process for contracting with architectural and engineering firms to ensure sustainable building features. The architectural and engineering firms now receive guidance in the form of two sets of sustainable building checklists — the Tier checklists. Tier 1 contains features determined to be cost-effective and Tier 2 includes features determined to be acceptable, if they can be accomplished within budget. These checklists do not tell the project team how to design but help ensure that the project team considers a variety of sustainable building features.

Increased Energy Efficiency in the Capitol East End Project

The Technical Group continues to oversee implementation of the sustainable building measures at the East End Project (see below for more detail).

In-depth look

Capitol Area East End Project

In 1999, the Secretary of the State and Consumer Services Agency directed the Department of General Services, the California Integrated Waste Management Board, California Energy Commission, Department of Health Services, California Air Resources Board, and Department of Finance to reach consensus on a groundbreaking effort to incorporate sustainable building measures into the East End Project bid documents. This $392 million, five office building, 1.5 million square foot complex is the largest state government office building project in California's history.

Scheduled for completion in 2003, the East End Project will exceed the 1998 Title 24 energy efficiency standards by roughly 30 percent. The project also integrates day lighting techniques into building envelopes, improves building ventilation, incorporates recycled-content products with low or zero volatile organic compounds (VOCs), and uses water efficient irrigation and plumbing systems. As modeled, the East End is forecasted to save taxpayers $400,000 annually in energy savings.

To learn more, visit the project's website:
http://www.resd.dgs.ca.gov/projects/eastend/default.asp?mp=GreenPage/main.asp

Leadership Buildings

The Department of General Services contracted with HDR, a leading national architectural and engineering firm with sustainable building expertise, to conduct sustainable building reviews of five projects: the California Youth Authority, the California Science Center, the Department of Boating and Waterways, the Department of Forestry and Fire Protection, and the Department of Corrections. These projects were chosen for their uniqueness and/or ability to serve as prototypes. As a result of this review, these projects now serve as sustainable building design and construction models for similar facilities in each of these departments.

Sustainable Building Website

The Task Force helped develop a sustainable building website (www.ciwmb.ca.gov/GreenBuilding/TaskForce). Funded and maintained by the California Integrated Waste Management Board, this site contains background information on sustainable building; provides updates on the implementation of the Blueprint; lists relevant state mandates, performance standards, and specifications; identifies sustainable building programs and case studies; and details information about each step of the building cycle, especially the state process.

Inter-agency Training on Sustainability

The California Integrated Waste Management Board allocated funding to support Sustainable Building Task Force activities and develop and conduct sustainable building training. DGS's Energy Management Division hired HDR to develop the training program. (HDR conducted the sustainable building training for the federal General Services Administration.)

California Specifications for National Building Rating System

Developed by the United States Green Building Council (USGBC), the Leadership in Energy and Environmental Design (LEED™) is a nationally recognized system for rating sustainable buildings. The Sustainable Building Technical Group worked with the USGBC to supplement the national LEED™ standards with provisions reflecting California laws and regulations (similar to what other cities and states have done). Once approved by the Department of Finance, this new framework will serve as the foundation for the building performance standards necessary to achieve the Governor's sustainable building goals.

Links with Private Sector Building Owners

A formal collaboration was established with the Building Owners and Managers Association (BOMA). Cooperative efforts include: building operators training for DGS personnel, technical assistance on retrofit projects, and development of building performance and operating standards.

California Leadership Institute Outreach Program

The California Leadership Institute (CLI) is administered by the Department of Personnel Administration and designed to strengthen the leadership skills of senior executives in California government. Each executive participating in the CLI works on an interagency team project. Earlier this year, a CLI team prepared the first in a series of outreach tools — an electronic presentation that the Sustainable Building Task Force will use to educate state agency officials and key policymakers about sustainable building.

Modular Furniture Specifications

Task Force members worked with the furniture industry and private consultants to establish environmental specifications for the state's $60 million modular furniture contract. These environmental specifications, which include criteria for energy efficient lighting, recycled-content materials, and indoor air quality, are considered by the furniture industry as the most "sustainable" in the world. The Prison Industry Authority, the state's primary supplier of office furniture, is currently certifying its compliance with these new environmental specifications (see below for more detail).

In-depth look

Environmental Specifications for Office Furniture Systems

In 2000, the Department of Health Services, the California Integrated Waste Management Board, the California Energy Commission, other state agencies, private consultants and the office furniture industry, collaborated with the Department of General Services to issue a landmark environmental specification for procuring office furniture systems. This specification includes criteria for indoor air quality, recycled-content materials, and lighting. The Department of General Services used the specification to bid the three-year, $60 million, Open Office Panel System contract. To learn more about this specification, visit this website:

www.ciwmb.ca.gov/GreenBuilding/Specs/Furniture/default.htm

Incorporating environmental features into specifications is a means to facilitate widespread change. This example serves as a model for future procurements of other building materials such as carpeting, paints, ceiling tiles, and building insulation.

Collaborative for High Performance Schools (CHPS)

The Collaborative for High Performance Schools (CHPS) was formed to improve the energy performance of California's schools (see below for further detail). Several Task Force members are contributing expertise to help make this a comprehensive effort covering the full range of sustainable building topics. To date, the Collaborative has developed the *High Performance Schools: Best Practices Manual,* conducted a series of school design workshops, and received a federal grant to construct model high performance schools.

In-depth look

Educational Showcase

Collaborative for High Performance Schools (CHPS): In 1999, the California Energy Commission called together Pacific Gas and Electric, San Diego Gas and Electric, and Southern California Edison to discuss the best way to improve the energy performance of California's schools. Subsequently, CHPS was formed to improve the quality and performance of the physical school environment. CHPS is comprised of a diverse range of government, utility, and non-profit groups including: the California Department of Education, the Office of Public School Construction, Division of the State Architect, California Integrated Waste Management Board, California Air Resources Board, and Department of Health Services.

CHPS has an ambitious agenda for the next year, including workshops for school officials, architects and engineers, as well as implementing a $520,000 grant it was awarded from the federal Department of Energy to construct model high performance schools. High performance school design guidelines are downloadable from the CHPS website located at www.chps.net.

DeAnza College is constructing a model sustainable building that aims to surpass state energy efficiency standards by 60 percent and incorporate an array of sustainable building features. Completion is scheduled for 2003. kirshcenter.deanza.fhda.edu/home.html

University of California (UC) Santa Barbara's Donald Bren School of Environmental Science & Management was one of the nation's first 12 buildings to be certified by the U.S. Green Building Council for achieving Leadership in Energy and Environmental Design (LEED™) certification. www.bren.ucsb.edu/brenhall/

UC Merced will be the first American research university built in the 21st Century and will extensively incorporate sustainable design. UC Merced intends to construct sustainable buildings that reduce the use of material resources in construction and operation; minimize environmental impacts; obtain the lowest life cycle cost; and preserve natural resources for research and teaching purposes. UC Merced also received a grant from the US-EPA to conduct a sustainable building conference. The campus is scheduled to open in the fall of 2004. www.ucmerced.edu/

Excellence in Public Buildings Initiative

The Department of General Services has launched an initiative that complements the Sustainable Building Executive Order. The Excellence in Public Buildings Initiative addresses the way the state designs and constructs buildings, ensuring that community interaction, proper siting decisions, public art, aesthetic considerations, and sustainability are thoroughly integrated into the process. The Golden Seal program, which focuses on environmentally preferable cleaning products, is also a part of this overall effort.

Sustainable Procurement Task Force

This Task Force is collaborating with the Department of General Services Procurement Division to review procurement practices and develop sustainable specifications for building materials, systems, services, and products.

Department of Parks and Recreation (DPR)

The Task Force is assisting DPR as it incorporates sustainable building practices into its capital outlay program. Proposition 12 provides $2.1 billion for protection and restoration of California's natural resources, including water, rivers, beaches, air, and parks. It also has specific provisions regarding the development of urban parks, recreational activities, and the use of recycled-content materials. Task Force and DPR officials are in the process of identifying new construction and renovation projects to use as sustainable building prototypes.

Fuel Cell Collaborative

The ARB initiated a collaborative effort to advance the use of fuel cells for power generation in buildings and other stationary applications throughout California. The mission of the collaborative is to promote fuel cell commercialization as a means toward reducing or eliminating air pollutants and greenhouse gas emissions, increasing energy efficiency, and promoting energy diversity and independence.

California Commissioning Collaborative

This ad hoc group of government, utility, and building services professionals is committed to developing and promoting viable building commissioning practices in California. The California Commissioning Collaborative aims to facilitate the development of cost-effective programs, tools, and techniques to encourage building commissioning in new and existing buildings.

Greening of the Capitol

Members of the Task Force, in conjunction with, legislative staff, the Sacramento Municipal Utility District (SMUD), various sustainable building experts, and the Rocky Mountain Institute participated in a Greening of the Capitol workshop. Modeled after the "Greening of the White House" project, this workshop evaluated energy, water, and recycling issues; landscape management practices; and indoor air quality in the state's most prestigious building. The final Greening of the Capitol report will provide a list of sustainable capital outlay operations and maintenance strategies to the Legislature for review.

Partnerships with Federal, Local, and Non-Profit Entities

The Task Force established partnerships with the California Green Building Collaborative, a group of cities and counties working to develop sustainable building guidelines, as well as with the federal Department of Energy, General Services Administration, and U.S. Environmental Protection Agency. The Task Force is collaborating in a number of different areas with these entities, including the ENERGY STAR® for Buildings program, environmentally preferable product purchasing, and post-occupancy evaluation programs. Additionally, among others, Task Force members have cooperated with Global Green, the United States Green Building Council, and the Natural Resources Defense Council on various sustainable building issues.

Smart Growth

The Governor's Office of Planning and Research (OPR) has initiated a series of "Smart Growth Roundtables" up and down the state. These Roundtables have involved 18 different communities — urban and rural — and have engaged over 400 stakeholders, including local elected officials, city planners, county counsels, environmental groups, financial institutions and private developers. The Roundtables have been co-sponsored by the League of California Cities, the California State Association of Counties, the Local Government Commisison, and the Regional Council of Rural Counties. The sessions have produced a wealth of ideas for smart growth that OPR is synthesizing into a "Smart Growth Playbook". The Playbook will constitute a comprehensive set of statewide policies that have been embraced by a broad cross-section of interested participants in the smart growth debate. (See Appendix 3 for additional smart growth activities sponsored by the Legislature and the State Treasurer's Office.)

TRENDS AND BARRIERS

Even with the number of sustainable building activities described in the previous section, the state's capital outlay process still lacks a fully integrated sustainable building program. This section highlights the trends that complement the sustainable building effort and the barriers hampering full-scale implementation.

TRENDS FOR SUSTAINABLE BUILDING

Environmental concerns, economic policies, and technological advances are affecting the way Californians live, work, learn, and play. These factors also create new design, construction, and operation demands on state facilities and the infrastructure that supports them. The Task Force identified several trends and their roles in fostering the Governor's sustainable building goals.

Environmental and Health Concerns

Public opinion polls have shown a growing awareness of and interest in how buildings affect the environment, worker productivity, and public health. As a result, both the public and private sector are beginning to demand buildings that optimize energy use; promote resource efficiency; and improve indoor environmental quality.

Technological Advances

Building design and construction technologies, including recycled-content products, energy generation equipment, and mechanical and electrical systems, have improved markedly in durability, quality, maintenance requirements, and operational effectiveness. These new technologies are gaining acceptance among building design and operations professionals, who, in turn, are increasingly willing to specify and use these products.

Energy Costs

Increasing and fluctuating utility prices are driving building owners and operators to seek energy efficient building solutions, including designs that incorporate natural lighting, occupancy sensors, and on-site power generation. Our information-based economy is also pushing developers to provide buildings that offer workplaces with reliable and efficient energy sources.

Sustainable Buildings Economics

Developers, owners, operators, insurers, and the public at large are beginning to value and market the benefits of sustainable building. Those leasing space view buildings that perform better and have lower operating costs more positively. This will translate into more favorable lending and underwriting rates and lower tenant turnover.

Policies and Programs

All levels of government have adopted laws, ordinances, programs, and initiatives that complement the principles embodied in the sustainable building model. These include smart growth initiatives; resource efficient ordinances; brownfield and transportation corridor projects; waste diversion mandates; and tax policies that encourage businesses to relocate to the urban core.

Many state initiatives and mandates also support the Governor's sustainable building goals. Visit www.ciwmb.ca.gov/GreenBuilding/TaskForce, for more information about state regulations and statutes that complement the Sustainable Building Executive Order, particularly in the following areas:

- Indoor air quality and reduced exposure to toxic contaminants;
- Purchase of recycled products and diversion of solid waste from landfills;
- Water efficiency; and
- Energy efficiency.

Barriers to Sustainable Building

Despite the benefits attributed to sustainable building and the aggressive efforts of the Sustainable Building Task Force and Technical Group, barriers still exist. The success of the Governor's sustainable building goals are directly tied to overcoming these barriers. The following section describes the barriers identified by the Task Force and Technical Group.

Incomplete Integration

Process integration is a key component of sustainable building. The state's current capital outlay process, however, is not sufficiently integrated to address issues across disciplines and among stakeholders. For example:

- Each project phase, from the conceptual scope through construction, works largely in isolation from other phases, often with different project goals and separate budgets.
- There are limited, if any, specific procedures to implement an integrated systems approach, life cycle costing, or post-occupancy evaluation.
- Feedback and reporting mechanisms are lacking. State agency professionals know a tremendous amount about building design, construction, and performance. Unfortunately, there is no systematic or routine method to ensure that successes and failures are shared.

Focus on First Costs

The capital outlay budget process primarily focuses on a project's first cost and not on longer term operational, maintenance, and worker productivity factors. To the extent that these long-term costs are reviewed, they are analyzed as individual components rather than bundled as part of the overall life cycle cost equation.

Sustainable buildings may incur higher first costs than other buildings due to alternative design analysis, computer energy modeling, product research, post-occupancy evaluation, and life cycle costing. Task Force review found, however, that if these elements are incorporated during the project development and integrated design phases, the potential for higher first costs is greatly reduced.

In-depth look

Integrated Design, Life Cycle Costing, Commissioning, and Post-Occupancy Evaluation

The Governor's Executive Order calls for the use of an integrated design approach and life cycle costing.

An integrated design approach evaluates all building components and subsystems collectively, through a process that brings together the entire building team. This approach avoids the pitfalls of a piece-meal process that may result in selecting a cost-effective feature that works counter to other beneficial features.

Life cycle costing is a way of assessing total building cost over time. It consists of:

- Initial costs (design and construction);
- Operating costs (energy, water/sewage, waste, recycling, and other utilities);
- Maintenance, repair, and replacement costs; and
- Other environmental or social costs/benefits (impact on transportation, solid waste, water, energy infrastructure; worker productivity; outdoor air emissions; etc).

Commissioning and post-occupancy evaluation programs ensure that building systems are operating properly and gather data about the opinions and experiences of building occupants. This provides direct evidence about building performance relative to its specifications.

Together, these elements provide a complete picture. Integrated design and life cycle costing provide a means of reviewing, estimating, and comparing various building system and design options. Commissioning and post-occupancy evaluation help ensure that selected systems and equipment perform as intended.

The state's current capital outlay process treats initial capital costs separately from ongoing operation and maintenance costs and analyzes systems individually rather than as a whole building. This artificial separation creates a fiscal decision-making process that provides little incentive to make capital spending decisions based on long-term operational or maintenance savings. In the Recommendations and Action Plan section of this document, the Task Force outlines steps to incorporate life cycle costing, integrated design, commissioning, and post-occupancy evaluation into the state's capital outlay program.

Lack of Life Cycle Costing

Even if sustainable building projects do have higher first costs, frequently these costs are recoverable, within a short time frame, from lower operational and maintenance costs. Life cycle savings, however, are never recognized if buildings are valued as a first cost budget item and not a long-term investment. Recent Department of Finance funding allocations will help to alleviate this difficulty by enabling additional design and cost analysis to occur.[18]

Insufficient Building Performance and Operating Standards

Various regulatory, statutory, and administrative provisions govern the state's capital outlay program. But there are no uniform building performance and/or operating standards for state buildings (e.g., a LEED™-based set of standards). Such standards are fundamental components of sustainable building. Properly drafted, these standards are not prescriptive requirements but result-oriented performance measures.

Lack of Incentives

Incentives can play a key role in the development of sustainable buildings. Because builders and designers do not profit directly from a building's operational cost savings, environmental performance or worker productivity, they have no real incentive to try new techniques or products.

Given the Governor's sustainable building goals and the Department of General Services' Excellence in Public Buildings Initiative, the state should develop incentives that not only promote sustainable building but also reward its application.

Failure to Comply with State Law

As mentioned previously, compliance with many existing state statutes complementing the Governor's sustainable building goals often falls short of the mark (e.g., recycled-content product procurement statutes). Currently, the Task Force is reviewing these statutes to determine how best to incorporate them into the sustainable building implementation effort.

Insufficient Technical Information

Unfamiliarity with products, technologies, and systems raises obvious concerns for designers and fiscal staff who are responsible for building performance, safety, and project delays. Unfortunately, many sustainable building applications are prematurely labeled as "unproven" or "too costly." This is frequently more a perception than reality, often stemming from a lack of information. Providing technical assistance, product specifications, and case study information will help address these concerns.

RECOMMENDATIONS AND ACTION PLANS

The recommendations set forth in this *Blueprint* seek to institute the Governor's sustainable building goals by maximizing the opportunities presented by current sustainable trends and resolving the issues presented by the barriers identified in the preceding section. The *Blueprint* recommends a ten-point plan.

1. **Modify the state's capital outlay process to ensure that the Governor's sustainable building goals are met and that appropriate projects are reviewed by the Sustainable Building Task Force.**

2. **Incorporate life cycle costing, integrated design, commissioning, and post-occupancy evaluation into the state's capital outlay program.**

3. **Develop cost-effective building performance, operation, and maintenance standards.**

4. **Invest additional resources for full-scale implementation of sustainable building practices.**

5. **Develop comprehensive annual reporting requirements to measure progress in implementing the state's sustainable building goals.**

6. **Develop "leadership buildings" to showcase sustainable building practices.**

7. **Develop sustainable building technical assistance and outreach tools, including a training program for state departments, as well as local government and private sector partners.**

8. **Create programmatic, fiscal, and administrative incentives to facilitate the implementation of successful sustainable building approaches, including a Governor's Sustainable Building Award.**

9. **Implement guidelines to acquire leased space with cost-effective sustainable building features.**

10. **Provide Task Force assistance to other federal, state, and local agencies in key infrastructure areas.**

Achieving Sustainable Building Goals

The major Task Force goal is for all significant,[1] and later for all new building construction,[2] renovation, and appropriate building leases[3] to meet the sustainable building performance, operation and maintenance standards, guidelines, and specifications developed as part of this report, by June 2002 and June 2003 respectively.

To achieve this goal, the Task Force, under the direction of the Secretary of SCSA, is responsible for meeting the following major milestones within the next year:

- Formally establish the Sustainable Building Task Force and Technical Group, and ensure their review of all significant building construction projects;
- Develop recommendations to modify the state's capital outlay process to incorporate sustainable building practices;
- Identify the programmatic, environmental, economic, and other performance measures that will be used for evaluation;
- Review, develop, and update guidelines, performance standards, policies, regulations, and specifications;
- Develop website and distribute educational and program information;
- Develop a Governor's award program for sustainable design and construction projects in partnership with the Department of General Services' Excellence in Public Buildings Initiative; and
- Issue Sustainable Building Progress Reports annually, including updates by state agencies with significant capital outlay programs on their implementation of the Governor's Executive Order.

[1] *Significant* projects include those over 50,000 square feet or prototype buildings that can be replicated and impact over 50,000 square feet of construction, or highly visible buildings that serve an educational purpose.

[2] *Construction* refers to building construction activities rather than dams, bridges, roadways, replacement of equipment, or other non-building construction, and includes new buildings, renovations, and construction at leased facilities.

[3] *Appropriate* refers to leases where the state has the ability to influence the design and construction of the building such as build-to-suit leases.

RECOMMENDATION 1: MODIFY THE STATE'S CAPITAL OUTLAY PROCESS TO ENSURE THAT THE GOVERNOR'S SUSTAINABLE BUILDING GOALS ARE MET AND THAT APPROPRIATE PROJECTS ARE REVIEWED BY THE SUSTAINABLE BUILDING TASK FORCE.

The state's current capital outlay process does not incorporate sustainable building practices fully and effectively. To provide the necessary framework for implementing the Executive Order, the Task Force recommends:

- Formally establishing the Sustainable Building Task Force and Technical Group;
- Identifying specific modifications to existing capital outlay policies;
- Incorporating sustainable building practices into all significant projects; and
- Requiring Task Force technical review of certain "leadership" projects.

	RECOMMENDED ACTIONS	Due Dates
1-1	Formally establish the Sustainable Building Task Force and Sustainable Building Technical Group, comprised of representatives from state environmental, natural resources, public health, construction, transportation, higher education, and other departments. Assign members relevant responsibilities according to *Blueprint* recommendations.	February 2002 Ongoing
	• Assign Task Force and Technical Group members specific duties associated with the *Blueprint*. Identify and coordinate activities with other state task forces and commissions (e.g., the Sustainable Procurement Task Force and the Commission on Infrastructure in the 21st Century).	February 2002 Ongoing
	• Develop and implement a process to review and approve specific capital outlay project documents (e.g., RFQs, RFPs, COBCPs, and advertisements).	February 2002
	• Develop an Executive Order that establishes a state facility siting policy, including such factors as proximity to public transportation and affordable housing, mixed use and historic preservation considerations, and design options to promote resource efficiency and community interaction. (See Appendix 2 for the Governor's Siting Executive Order D-46-01.)	Completed
1-2	Formally establish the Sustainable Building Advisory Council, appointed by the Secretary of the State and Consumer Services Agency. This Advisory Council will provide a forum for other public and private entities to discuss sustainable building issues (e.g., at quarterly meetings and/or annual conferences).	April 2002 Semi-annual meetings
1-3	Modify the state's capital outlay process to incorporate sustainable building practices into all significant projects,[1] and later for all new building construction,[2] renovation, and appropriate leases.[3] These projects shall meet the building performance, operation and maintenance standards, guidelines, and specifications developed as part of this *Blueprint* (see Recommendations 3 and 9).	June 2002 significant projects June 2003 all projects
	• Conduct analysis of the current administrative requirements and structure of the existing capital outlay process. Review other city, state, and federal government models.	Annual updates each November
	• Propose changes to modify the existing capital outlay program's administrative policies and structure.	February 2002 Ongoing
	• Incorporate sustainable building elements into the state's 5-Year Capital Outlay Plan; long range asset planning activities; and the capital outlay budget development process.	Ongoing
	• Modify state administrative manuals, as appropriate.	Ongoing

[1] *Significant* projects include those over 50,000 square feet, or prototype buildings that can be replicated and impact over 50,000 square feet of construction, or highly visible buildings that serve an educational purpose.

[2] *Construction* refers to building construction activities rather than dams, bridges, roadways, replacement of equipment, or other non-building construction, and includes new buildings, renovations, and construction at leased facilities.

[3] *Appropriate* refers to leases where the state has the ability to influence the design and construction of the building such as built-to-suit leases.

RECOMMENDATION 2: INCORPORATE LIFE CYCLE COSTING, INTEGRATED DESIGN, COMMISSIONING, AND POST-OCCUPANCY EVALUATION INTO THE STATE'S CAPITAL OUTLAY PROGRAM.

The Executive Order requires implementation of certain sustainable building practices, specifically, life cycle costing and an integrated design approach, which includes commissioning and post-occupancy evaluation. Implementing these approaches involves:

- Incorporating the use of an integrated design approach into the project development process;
- Developing an applicable life cycle costing method to analyze the full range of quantitative and qualitative sustainable building benefits; and
- Establishing commissioning and post-occupancy evaluation programs to ensure that building performance is periodically monitored and systems operate as designed.

The Task Force has already initiated activities to incorporate these elements into the capital outlay program, including meetings with the Department of Finance and the Department of General Services. The Task Force is also developing the scope of work for a study to analyze techniques to perform life cycle costing approaches. Additionally, the Division of the State Architect and the California Energy Commission are developing commissioning and post-occupancy evaluation programs.

	RECOMMENDED ACTIONS	Due Dates
2-1	Develop a methodology to analyze life cycle costing for the full range of qualitative and quantitative sustainable building benefits or their equivalencies.	Ongoing
	• Work with the Department of Finance to review life cycle costing approaches, policies, and legislation. Identify factors that can be calculated directly and indirect measurements for other factors. Develop framework to bundle costs and benefits, treating the building as one system rather than separate components.	March 2002
	• Convene a series of discussions with sustainable building experts to evaluate life cycle costing methodologies (e.g., utilities, the federal government).	Ongoing
	• Conduct a research study that addresses life cycle costing and the cost and benefits of sustainable building.	May 2002
	• Establish a methodology to incorporate these changes into the state's capital outlay program. The methodology may include the need for further research, computer modeling, and the creation of *base case* buildings by facility type, size, and climate zone, to use for comparison purposes.	June 2002 Ongoing
2-2	Incorporate an integrated design approach into the state's capital outlay process.	Ongoing
	• Propose administrative changes to incorporate an integrated design approach. Update process as required.	Annual updates each December
2-3	Work with DGS to develop a post-occupancy evaluation program.	February 2002
	• Develop a strategic plan and the criteria for conducting post-occupancy evaluations.	Completed
	• Integrate post-occupancy evaluations into the design goals for select projects.	Completed
	• Conduct a post-occupancy evaluation study on a sample of buildings.	Ongoing
	• Survey significant buildings over the long-term and document performance, costs, and savings.	Ongoing
2-4	Work with DGS and the Division of the State Architect to develop a commissioning program.	March 2002
	• Convene a series of meetings on developing a commissioning program.	February 2002
	• Conduct a symposium on commissioning.	Completed

Recommendation 3: Develop cost-effective building performance, operation, and maintenance standards.

The State of California lacks building performance, maintenance, and operation standards that fully and effectively incorporate sustainable building concepts. The Task Force recommends that the state adopt standards to ensure defined levels of building performance, operation, and maintenance, while offering design flexibility in how these objectives are achieved. These standards should be LEED™-based and supplemented by the applicable state environmental laws and regulations.

The Task Force compiled a list of existing statutes and regulations that complement the sustainable building effort and developed draft building performance standards based on the LEED™ framework.[1] This CA LEED™ supplement is under review by the Department of Finance. Additionally, the Department of General Services created maintenance guidelines as part of its Golden Seal Program. The Task Force needs to work with DGS to develop building operating standards.

	RECOMMENDED ACTIONS	Due Dates
3-1	Identify existing state laws, regulations, and other policies that complement the Governor's sustainable building goals. Incorporate relevant elements into the development of building performance, maintenance, and operating standards for state-owned and leased facilities. For example, integrating current recycled-content product procurement statutes, exceeding Title 24 energy efficiency standards, establishing siting criteria, and incorporating indoor environmental quality must be part of the standards.	Annual updates each July
3-2	Explore and report on the development of a state "green power" policy, similar to those enacted by the State of New York, City of Chicago, and the federal government under Executive Order 13123. In exploring the development of this policy, the Task Force should consider incorporating minimum levels of on-site renewable power generation to satisfy specific electrical loads (e.g., information technology and safety system), green power purchasing agreements, and the use of specific green power technologies (e.g., fuel cells and photovoltaics).	July 2002
3-3	Draft and update building standards: LEED™ supplement for California, maintenance and operating standards[2] and guidelines[3] (Tier Checklist).	Annual updates each May
3-4	Review and update maintenance and operating standards.	Annual updates each May
3-5	Submit draft building standards and guidelines to the Department of Finance for review.	Annual updates each June
3-6	Adopt approved standards and guidelines into the capital outlay process and other relevant state programs (e.g., Golden Seal Program and state leasing requirements).	Annual updates each July

[1]A draft is available at www/ciwmb.ca.gov/GreenBuilding/Design.

[2]Develop performance standards using the Leadership in Energy and Environmental Design™ (LEED) 2.0, or other, as a framework.

[3]Guidelines include checklists (Tiers) that DGS is currently using, which shall be updated at least annually. Other guidelines include, but are not limited to: DHS' requirements for avoiding possible health effects from electric and magnetic fields in the design and construction of schools, water-efficient landscaping, and design for recycling space. Guidelines shall consider building type, climate, length of occupancy, life cycle costing, and similar requirements from other state programs.

RECOMMENDATION 4: INVEST ADDITIONAL RESOURCES FOR FULL-SCALE IMPLEMENTATION OF SUSTAINABLE BUILDING PRACTICES.

The Task Force recommends increasing resources to implement the Executive Order more effectively. These funds will enable the capital outlay budgeting process to shift from one predicated on first cost to one that includes life cycle costing and an integrated design approach. As mentioned earlier, the Department of Finance recently agreed to include additional funding for sustainable design analysis on a project-by-project basis for such activities as energy modeling, computer simulations of siting and design alternatives, and product specification reviews. These sustainable design options, in turn, will be analyzed to determine which technologies and systems can be incorporated into the project's construction budget.

The Task Force also recommends the development of an inter-agency program budget change proposal. Analysis of state agency resources in the areas of indoor air quality, water, waste, and energy efficiency; and design and procurement are inadequate to implement many of the recommendations outlined in this report. The Task Force proposes to submit a joint budget change proposal to address this issue. The budget change request would identify new resources, and redirect or augment existing resources to implement the Governor's sustainable building goals.

	RECOMMENDED ACTIONS	Due Dates
4-1	Identify the existing fiscal resources in various state agencies that are applicable to the sustainable building effort.	Completed
4-2	Prepare and submit a joint program budget change proposal that reflects the identification of new resources and the redirection and/or augmentation of existing resources to fund the recommendations in the *Blueprint*.	May 2002
4-3	Pursue additional funding options to implement the sustainable building goals.	Ongoing
	• Identify and analyze options for financing capital outlay projects. Consider the state's G$Smart program, municipal and investor owned utility programs, Power Authority bond funding, Public Utility Commission's public goods charge monies, federal, state, nonprofit grant funding, and other mechanisms.	Completed
	• Prepare and submit proposals for additional funding.	Ongoing
4-4	Prepare a proposal to include an additional funding increment for design analysis in capital outlay budget packages. The Department of General Services proposed and the Department of Finance reviewed and approved increasing design fees on a project-by-project basis.	Completed

RECOMMENDATION 5: DEVELOP COMPREHENSIVE ANNUAL REPORTING REQUIREMENTS TO MEASURE PROGRESS IN IMPLEMENTING THE STATE'S SUSTAINABLE BUILDING GOALS.

The Executive Order calls for annual reports, a requirement that the Task Force considers as key to measuring the state's progress towards achieving the Governor's sustainable building goals. The Task Force plans to develop a *Program Reporting Protocol* to describe and evaluate various recommendations outlined in the *Blueprint.* The annual reports shall include information about:

- Task Force activities, including updates by state agencies with significant capital outlay programs on their implementation of the Governor's Executive Order;
- Building performance and operating standards;
- Environmental and economic impacts;
- Building benchmarking efforts; and
- Other benefits/costs.

In addition, reports may include anecdotal information on non-quantifiable benefits and costs, which may illustrate comfort, social impacts, environmental justice, and transportation issues.

	RECOMMENDED ACTIONS	Due Dates
5-1	Develop and distribute a *Program Reporting Protocol* to describe and evaluate criteria for each recommendation in the *Blueprint* (the Protocol may phase in reportable activities).	February 2002 Ongoing
5-2	Establish baseline benchmarks for a representative set of state-owned and leased facilities.	February 2002 Ongoing
5-3	Track and report on building performance, including, but not limited to, the items below.	Annual updates each April
	• Track policy and process changes, including the capital outlay program and the design, construction, and leasing processes. Provide examples of documents and specifications that have been modified to incorporate the Executive Order goals and assess the effectiveness of these changes.	Ongoing
	• Track the use of various fiscal, programmatic, and administrative incentives; the number of people trained; types of technical resources produced; the number of partnerships formed; and the use of the website.	Ongoing
	• Track the number of buildings that meet sustainable building performance standards, guidelines, specifications, and related state laws and policy objectives. For new buildings, track the associated energy, water, and material savings; reduction in indoor air emissions; and incorporation of other sustainable design features. For leased facilities, track utility bills, leases, and retrofits that incorporate sustainable building practices.	Ongoing
	• Track design, construction, operational, and maintenance costs and savings over a specified time period for a representative set of buildings.	Ongoing
	• Track anecdotal information on non-quantifiable benefits and costs, which may include, but are not limited to, comfort, environmental justice, transportation and other societal impacts.	Ongoing
	• Track information on state agency implementation of the Governor's sustainable building goals, particularly the activities of departments with major capital outlay programs.	Ongoing
5-4	Submit annual report to the Governor.	Annual updates each July

Recommendation 6: Develop "leadership buildings" to showcase sustainable building practices.

The Task Force will identify specific new capital outlay, leased facility, and renovation projects to design and construct as "leadership buildings." Each year, certain capital outlay projects, due to their size, complexity, uniqueness, or prototypical design value, can serve as showcase sustainable buildings. As recommended, the Department of General Services will compile a list of projects for discussion and the Task Force will select leadership projects for intensive technical assistance. This effort also may result in recommendations for additional resources.

The Task Force will also look for opportunities to partner with local governments, the Collaborative for High Performance Schools (CHPS), municipal and investor owned utilities, and others to identify exemplary projects. The "leadership building" process will help educate stakeholders about sustainable building practices and showcase new construction, renovation, and demonstration projects.

	RECOMMENDED ACTIONS	Due Dates
6-1	Establish a process to identify and develop "leadership buildings".	Ongoing
	• Develop a protocol to ensure that selected projects meet Sustainable Building Task Force approval. This protocol may include DGS project briefings and review/approval of RFP and RFQ documents.	January 2002 Ongoing
	• Select "leadership" projects in the early stages of the capital outlay process. These projects should provide examples of sustainable building technologies, materials, products, and systems.	Annual updates each June
	• In partnership with public utilities, local governments, Sustainable Building Advisory Council, and other entities establish a program to identify and develop "leadership buildings".	March 2002
6-2	Compile and distribute information on "leadership buildings", including: ◦ Number of state facilities with sustainable building features ◦ Type of building ◦ Climate zone ◦ Square footage ◦ Number of occupants ◦ Total cost of building ◦ Annual operating costs of building ◦ Performance level of each building (e.g., LEED™ rating) ◦ Projected whole building savings over the long-term ◦ Occupant satisfaction and productivity ◦ Lessons learned ◦ Vendor information ◦ Design and construction process innovations	Annual updates each June
6-3	Prepare and collect information on selected buildings for case studies (see Recommendation 7).	Ongoing

RECOMMENDATION 7: DEVELOP SUSTAINABLE BUILDING TECHNICAL ASSISTANCE AND OUTREACH TOOLS, INCLUDING A TRAINING PROGRAM FOR STATE DEPARTMENTS, AS WELL AS LOCAL GOVERNMENT AND PRIVATE SECTOR PARTNERS.

Successful implementation of the Executive Order will depend on educating state agency staff about sustainable building practices. The Task Force will develop technical resources and provide sustainable building outreach to state officials and others. Activities will include maintaining a comprehensive website, preparing case studies, establishing procurement specifications, convening workshops, and developing a training program.

The Task Force worked with the Department of General Services and the California Integrated Waste Management Board (CIWMB) to develop a contract for training services. The Task Force also established a website maintained by the CIWMB that includes case studies, design guidelines, and links to other sustainable building websites.

	RECOMMENDED ACTIONS	Due Dates
7-1	Provide technical assistance during the design and development process for project concepts, budget packages, and other capital outlay phases.[1]	Ongoing
	• Develop and fund contracts for sustainable building architectural and engineering services.	Completed
	• Explore partnership opportunities with the utilities' "Savings By Design" program as one approach to provide technical assistance and resources (see Recommendation 8).	January 2002
7-2	Implement an effective training program.	Ongoing
	• Establish an interagency agreement between the Department of General Services and the California Integrated Waste Management Board to develop a sustainable building training program.	Completed
	• Develop training modules and conduct training for stakeholders. Assess the need for additional funding to expand the training program (e.g., conduct discussions with the Division of the State Architect).	Ongoing
7-3	Develop and compile an "electronic tool kit" including, fact sheets, guidelines, performance standards, model specifications, sample request for proposals, sample public notices, case studies, resource listings, videos, exhibits, databases, software tools, and press releases.	Ongoing
7-4	Establish and maintain a sustainable building website.	Ongoing
	• Explore the inclusion of virtual tours, electronic bulletin boards, listserves and other informational clearinghouse services.	September 2002
7-5	Develop sustainable building specifications.	Ongoing
	• Work with the CEC to compile a reference specifications guide for various sustainable products and systems. Update reference specifications annually.	January 2002 Ongoing
	• Work with the manufacturing and building industries to encourage development and testing of sustainable products.	March 2002
	• Work with the U.S. Department of Energy, U.S. Environmental Protection Agency, General Services Administration, and the state's Sustainable Procurement Task Force to develop a plan, database, and model specifications for sustainable building products, materials, and systems to include in contracting documents.	Ongoing

[1]Full implementation of this recommendation depends on having adequate resources for participating Task Force agencies.

RECOMMENDATION 8: CREATE PROGRAMMATIC, FISCAL, AND ADMINISTRATIVE INCENTIVES TO FACILITATE THE IMPLEMENTATION OF SUCCESSFUL SUSTAINABLE BUILDING APPROACHES, INCLUDING A GOVERNOR'S SUSTAINABLE BUILDING AWARD.

The Task Force identified various programmatic, administrative, and fiscal incentives that would help facilitate the adoption of the Governor's sustainable building goals. These incentives include design competitions, a Governor's Sustainable Building Award, streamlining the administrative procurement processes for sustainable building features, and financial incentives. Among the financial incentives to be considered are tax credits, bonuses for developers whose buildings meet and/or exceed required performance standards, funding for design assistance, and grants for sustainable building demonstration technologies.

	RECOMMENDED ACTIONS	Due Dates
8-1	Develop a sustainable building incentive package, including programmatic, fiscal, and administrative elements.	Ongoing
	• Catalog fiscal and programmatic incentives offered by other public and private entities, including federal, local, and state governments.	Completed
	• Propose fiscal incentives for review and adoption by the Department of Finance.	March 2002
	• Establish a fiscal incentive package that encourages sustainable building, including construction and demonstration project grants, no and/or low interest loans, tax credits, municipal and investor-owned utility programs, and design assistance incentives.	March 2002
	• Evaluate and report on streamlining the administrative procurement process for sustainable building products, systems, and technologies.	March 2002
8-2	Establish a sustainable building design competition and a Governor's Sustainable Building Award program, in partnership with the Department of General Services' Excellence in Public Building Initiative. Awards should recognize projects in the design phase, as well as completed projects.	April 2002 Ongoing

Recommendation 9: Implement guidelines to acquire leased space with cost-effective sustainable building features.

State government leases over 21 million square feet of office space throughout California, representing about 10 percent of the state's space needs. The Task Force worked with the Department of General Services to modify the state's current leasing policies and contracting process to include sustainable building features. Recently, the Department of General Services developed a model sustainable building lease. Having such a lease document will increase the numbers of state employees working in sustainable buildings and promote the use of sustainable building practices among commercial property owners.

	RECOMMENDED ACTIONS	Due Dates
9-1	Review sustainable leasing contracts for other cities, states, and the federal General Services Administration. Identify the appropriate sustainable building features and operating standards for leased space. Develop corresponding language to be incorporated into the state's standard lease specifications.	Completed
	• Review and update model sustainable lease language.	Annual updates each July
9-2	Include state leasing staff in the sustainable building training program (see Recommendation 7).	Ongoing
9-3	Notify DGS's Energy Management Division of each new lease or renewal lease in which the state agency pays the utility bills directly.	Ongoing
9-4	Explore financial incentives (e.g., no and/or low interest loans, tax incentives, grants, and utility program funds) for building owners that lease to the state to upgrade their properties with sustainable building features.	Ongoing
9-5	Meet with public entities to encourage them to finance the construction and/or renovation of buildings using sustainable practices (e.g., Public Employees Retirement System, State Teachers Retirement System, and the State Treasurer).	Ongoing
9-6	Develop comprehensive lease renewal criteria to review possible retrofit opportunities for currently leased space.	Ongoing
9-7	Meet with property owners leasing to the state to discuss the Governor's sustainable building and energy efficiency goals (e.g., the Building Owners and Managers Association, Arden Realty, Sacramento owners of state-leased facilities, and others).	Ongoing

Recommendation 10: Provide Task Force assistance to other federal, state, and local agencies in key infrastructure areas.

The Task Force intends to promote the development of sustainable building throughout California. To this end, the Task Force identified actions that it will undertake with state agencies, local governments, the private sector, and other entities to achieve this goal.

	RECOMMENDED ACTIONS	Due Dates
10-1	**Collaborative for High Performance Schools (CHPS).** Continue participating with CHPS to develop workshops for school officials, architects, and engineers; refine the *CHPS Best Practices Manual;* and provide technical assistance on their model high performance school grant projects.	Ongoing
10-2	**University of California (UC) and California State University (CSU) Systems.** Assist the UC and CSU systems with their sustainable building programs and actively participate in the planning and design activities associated with the UC Merced campus (including their sustainable building conference).	Ongoing
10-3	**Community Colleges (CCC).** Assist the CCC system in providing training; expanding its energy management program; identifying and supporting the development of model capital outlay projects (e.g., DeAnza College project); and incorporating integrated design, life cycle costing, and post-occupancy evaluation into its capital outlay process.	Ongoing
10-4	**Department of Forestry (CDF).** Continue working with CDF to integrate sustainable building practices into its new construction and renovation projects.	Ongoing
10-5	**State Hospitals.** Identify opportunities to incorporate sustainable building practices into state and local hospital projects.	Ongoing
10-6	**Housing and Community Development (HCD).** Assist HCD in developing sustainable building grant criteria for its various programs, and identify other areas where incorporating sustainable building practices is appropriate.	Ongoing
10-7	**Commission on Building for the 21st Century.** Provide technical assistance in drafting the final report and assist the Commission in implementing any recommendations that pertain to sustainable building activities.	Completed
10-8	**California State Library.** Continue working with the California State Library to explore training opportunities and incorporate sustainable building practices into its grant criteria.	January 2002
10-9	**Los Angeles Exposition Park Sustainable Building Task Force.** Provide ongoing technical assistance to the Los Angeles Exposition Park Sustainable Building Task Force in the development of its design guidelines and project specifications, pursuant to the Green Action Plan.	Ongoing
10-10	**Department of Parks and Recreation (DPR).** Continue working with DPR to integrate sustainable building practices into its new construction and renovation projects. Develop a training program specific to DPR capital outlay staff.	Ongoing
10-11	**Department of Corrections (CDC).** Collaborate with the Department of Corrections to develop a model sustainable correctional treatment facility prototype.	Ongoing
10-12	**Public Employees Retirement System (PERS).** Provide technical assistance on the development of the new headquarters project; monitor the PERS high performance building investment strategy; and explore opportunities to promote sustainable building practices in other state financing and investment programs (e.g., the State Teachers Retirement Fund, State Treasurer, and the Infrastructure Bank and other programs within the Technology, Trade, and Commerce Agency).	Ongoing
10-13	**Department of Transportation (Caltrans).** Continue providing technical assistance on the new district offices in San Diego and Los Angeles. These projects should become part of the "leadership building" effort. Identify other opportunities to incorporate recycled content materials and other sustainable specifications into the Caltrans' road construction program.	Ongoing
10-14	**Proper Siting Considerations.** Develop a partnership with the State Treasurer's Office to assist in the implementation of the various initiatives under the "Smart Investments Program."	Ongoing
10-15	**Utilities.** Work with investor owned utilities to improve and expand the use and effectiveness of the "Savings By Design" program. Explore sustainable building partnership opportunities with the municipal utilities.	Ongoing

	RECOMMENDED ACTIONS (Cont'd.)	Due Dates
10-16	**Department of General Services.** • Maximize opportunities for front-end sustainable building design by working with the Department of Finance and the Department of General Services on augmented capital outlay budget packages. • Infuse the Department of General Services' Excellence in Public Buildings Initiative with outstanding sustainable building practices through the development of a design competition, a Governor's awards program, and post-occupancy evaluation criteria for state buildings. • Support the Sustainable Procurement Task Force's efforts to develop specifications and programs for the purchase of sustainable, energy efficient, and recycled content products, services, and materials. • Develop sustainable building performance, maintenance, and operation standards. • Benchmark state facilities using the federal government's ENERGY STAR® for Buildings Program. • Conduct a series of meetings between the Sustainable Building Task Force and the Excellence in Public Buildings working group to determine roles and responsibilities. • Continue partnership activities with the California Commissioning Collaborative and the California Fuel Cell Partnership.	Ongoing
10-17	**Local, State, and Federal Government.** Explore partnership opportunities with other cities, states, and the federal government, (e.g., the federal Rebuild America Program, Seattle's and Pennsylvania's sustainable building programs, and the California Green Building Collaborative).	Ongoing
10-18	**Private and Non-Profit Sectors.** Work with members of the California Building Owners and Managers Association, the United States Green Building Council, Global Green, the Natural Resources Defense Council, and others on sustainable building activities.	Ongoing

CONCLUSION

Implementation of the Task Force recommendations will realize the goals of the Governor's Sustainable Building Executive Order and guide the state toward a sustainable future. In the spirit of partnership, the members of the Sustainable Building Task Force will continue their commitment to an inter-agency process that dramatically improves the state's building process, ever mindful of the 19th century artist John Ruskin's observation that:

"WHEN WE BUILD, LET US THINK THAT WE BUILD FOREVER."

End notes

[1] California Energy Commission, 2001 California Peak Demand Staff Report prepared by Richard Rohrer, Summer 2001.

[2] US Department of Energy, December 18, 2000. http://www.sustainable.doe.gov/buildings/gbintro.shtml.

[3] California Integrated Waste Management Board, June 2001. http://www.ciwmb.ca.gov/ConDemo/.

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[5] U.S. EPA, Office of Air and Radiation, Targeting Indoor Air Pollution, EPA's Approach and Progress, March 1993. Document number #400-R-92-012.

[6] California Integrated Waste Management Board Solid Waste Tipping Fee Survey, 2000. http://www.ciwmb.ca.gov/landfills/TipFees/TFSums.htm

[7] Denison, Richard, *Environmental Life-Cycle Comparisons of Recycling, Landfilling and Incineration: A Review of Recent Studies,* 1996. http://www.environmentaldefense.org/AboutEDF/denison.pdf

Text Box, *The Energy Dimension,* p 3.

[1] California Energy Commission, California Energy Demand 2000-2010 Staff Report, June 2000.

[2] California Energy Commission, Staff Report, June 2000.

[3] California Public Utilities Commission, Press Release, March 27, 2001. http://www.cpuc.ca.gov/PUBLISHED/NEWS_RELEASE/5972.htm

[4] California Energy Commission, Assembly Bill 970 Emergency Rulemaking, 2001 Update of California Nonresidential Building Energy Efficiency Standards, Volume IV, Impact Analysis, p7, Table 2 and Assembly Bill 970 Residential Building Energy Efficiency Standards, Volume I, Summary, p 1-12, Table 4.

[5] Eley and Associates, memo to Gary Flamm, California Energy Commission, *Tier 1: A New Energy Standard for State Buildings, Performance Comparison Against 2001 Nonresidential Building Energy Efficiency Standard,* July 17, 2001.

[8] U.S. Environmental Protection Agency, Indoor Air Quality Program. Targeting Indoor Air Pollution, EPA's Approach and Progress, March 1993. http://www.epa.gov/iaq/pubs/targetng.html

[9] Wiley, James A., J. Robinson, T. Piazza, K. Garrett, K. Cirksena, Y. Cheng, and G. Martin, U.C. Berkeley for the California Air Resources Board, Activity Patterns of California Residents, March 1993.

[10] Wiley, James A., J. Robinson, Y. Cheng, T. Piazza, L. Stork, K. Pladsen, U.C. Berkeley for the California Air Resources Board, Study of Children's Activity Patterns, April 1994.

[11] Fisk, William J., Lawrence Berkeley National Laboratory, Health and Productivity Gains from Better Indoor Environments and their relationship with Building Energy Efficiency, 2000. This study reports US companies could save as much as $278 billion annually by preventing sick building illnesses (e.g., asthma) and improving worker performance through better indoor air.

Text Box, The Human Dimension, p 4.

[1] U.S. Environmental Protection Agency, Indoor Air Quality Program. *Targeting Indoor Air Pollution, EPA's Approach and Progress,* March 1993. http://www.epa.gov/iaq/pubs/targetng.html

[2] Heschong Mahone Group, *Skylighting and Retail Sales, An Investigation into the Human Relationship Between Daylighting and Human Performance,* August 20, 1999. http://www.lightforhealth.com/acrobat/retailc.pdf

[3] Heschong Mahone Group, *Daylighting in Schools, An Investigation into the Human Relationship Between Daylighting and Human Performance,* August 20, 1999. http://www.h-m-g.com/Daylighting/schoolc.pdf

[4] Fisk, William J., Lawrence Berkeley National Laboratory, *Health and Productivity Gains from Better Indoor Environments and their relationship with Building Energy Efficiency,* 2000. Sick building syndrome (SBS) symptoms are commonly reported by office workers and teachers who comprise about 50 percent of the workforce. In consultation with the author, Leon Alevantis, of the Calif. Department of Health Services, provided the following estimate: The California labor force in 1999 was about 17 million, of which an estimated 8.5 million are office workers and teachers. Published data indicate that on the average 23 percent of office workers and teachers reported multiple SBS symptoms that improve when they leave their workplace. This implies that about 2 million office workers and teachers are frequently affected by SBS symptoms. Multiplying the number of these employees by their annual average compensation and using a conservative estimate of a 2 percent decrease in productivity caused by SBS symptoms, results in an estimated cost of $6 billion.

[12] Intergovernmental Panel on Climate Change, Climate Change: the 1990 and 1992 IPPC Assessments (Geneva, Switzerland; World Meteorological Organization and United Nations Environment Program, 1992.)

[13] California Energy Commission, Assembly Bill 970 Emergency Rulemaking, 2001 Update of California Nonresidential Building Energy Efficiency Standards, Volume IV, Impact Analysis, p 7, Table 2 and Assembly Bill 970 Residential Building Energy Efficiency Standards, Volume I, Summary, p 1-12, Table 4.

[14] California Energy Commission, Assembly Bill 970 Emergency Rulemaking, 2001 Update of California Nonresidential Building Energy Efficiency Standards, Volume IV, Impact Analysis, p 7, Table 2 and Assembly Bill 970 Residential Building Energy Efficiency Standards, Volume I, Summary, p 1-12, Table 4.

[15] California Integrated Waste Management Board, June 2001, http://www.ciwmb.ca.gov/ConDemo/.

[16] The Collaborative includes the California Department of Education, the Office of Public School Construction, Division of the State Architect, California Integrated Waste Management Board, California Air Resource Board, and Department of Health Services.

[17] California Department of Finance, Capital Outlay and Infrastructure Report, p 13, 1999. http://www.dof.ca.gov/html/capoutly/capout.pdf

[18] The Department of Finance approved additional resources for design analysis on a project-by-project basis for various capital budget packages. These additional resources would be used for computer modeling, energy audits, product specifications, and alternative design review. The sustainable designs will then be analyzed to determine which technologies and systems that may have a higher first cost but provide life cycle savings will be incorporated into the project. Task Force review did find that the federal General Services Administration includes an additional 2.5 percent in their General Construction Cost Review Guide to incorporate sustainable building practices into capital projects.